

INSTRUCTION MANUAL

Type 1902A

A.M. F.M.

Signal Generator







## WARRANTY

The Tel-Instrument Electronics Corporation warrants each new product manufactured by it to be free from defective material and workmanship and agrees to remedy any such defect or to furnish a new part in exchange for any part of any unit of its manufacture which under normal installation, use and service discloses such defect, provided the unit is delivered by the owner to us intact for our examination with all transportation charges prepaid to our factory within ninety days from the date of sale to original purchaser and provided such examination discloses, in our judgment, that it is thus defective. This warranty does not include tubes or batteries.

This warranty does not extend to any of our products which have been subjected to misuse, neglect, accident, incorrect wiring not our own, improper installation, or to use in violation of instructions furnished by us, nor extend to units which have been repaired or altered outside of our factory, nor to cases where the serial number thereof has been removed, defaced or changed, nor to accessories used herewith not of our own manufacture.

Repair parts will be made available for a minimum period of five (5) years after the manufacture of this equipment has been discontinued.

This warranty is in lieu of all other warranties expressed or implied and no representative or person is authorized to assume for us any other liability in connection with the sale of our products.

ADDITIONAL INFORMATION with regard to the applications and maintenance of this equipment will be available from time to time. Users of our instruments are urged to discuss their problems with us and to suggest such modifications as might make them more adaptable to their special requirements.

Printed in U.S.A.  
Engineering Department  
TEL-INSTRUMENT ELECTRONICS CORP.  
728 Garden St.  
Carlstadt, N. J.  
07072





## OPERATING AND MAINTENANCE INSTRUCTIONS

### Type 1902A A.M. F.M. Signal Generator

The 1902A is a crystal-controlled signal generator which can be simultaneously amplitude and frequency modulated. The A.M. frequency is 400 cps and the percent modulation can be varied from 0 to 100%. The F.M. audio signal is 2,000 cps and the deviation can be varied in three steps from 0 to 1.67 KC, 5 KC or 10 KC.

The unmodulated output is 4.50 MC, and a maximum output of 0.75 volts across 75 ohms can be obtained. A variable attenuator of 10 DB and two step attenuators are provided; one of 20 DB and one of 40 DB for a maximum attenuation of 70 DB. All internal B supply voltages are regulated by means of an electronic regulator to insure stability, and the line cord is connected thru an R.F. filter to prevent any radiation from the power lines.

Two sweep voltages,  $180^{\circ}$  out of phase with each other, at the F.M. audio frequency, plus a phasing control which can vary the phase approximately  $180^{\circ}$ , are provided on the front panel. By using either sweep terminal, and adjusting the phasing control a total of almost  $360^{\circ}$  phase control is available at the front panel. With this feature a properly phased sweep of any F.M. detector system can be readily obtained.

#### Circuit Description:

The R.F. signal is derived from a 6AU6 (V2) crystal controlled oscillator of 180 KC. A 6AU6 (V3) reactance modulator phase modulates the output of V2. The amount of phase modulation is controlled by the amplitude of the audio signal applied to the grid





of V3. The output of V2 is multiplied by five in the first half of V4 and again by five in the second half, to provide a 4.5 MC signal to the grid of V5. The plate circuit of V5 is tuned to 4.5 MC and is link coupled to the attenuator. V5 also serves as the amplitude modulator.

Tube V6A is a 2,000 cps phase shift oscillator. Its output is applied to the grid of V10 by means of an RC network. This section of V10 is a split load amplifier. The audio signal developed across its cathode resistor is connected to a resistance divider whose taps can be switched by means of S6 to provide the three different deviations. R55 sets the maximum deviation. The second section of V10 is a split load phase inverter which provides two sweep voltages each  $180^{\circ}$  out of phase with the other. R56 and R57 control the phase.

Tube V6b is a 400 cps phase shift oscillator. Its output is connected to grid #3 of V5 and amplitude modulates the 4.5 MC signal. The amount of modulation is controlled by R37.

Tube V1 is the rectifier and V7, V8 and V9 constitute the regulated power supply. Tube V9 is the reference tube, V8 is a D.C. amplifier which amplifies both the ripple and the divided down D.C. voltage applied to its grid. Tube V7A is the series tube.

### Alignment

Turn the instrument "ON" and allow it to warm up for 15 minutes. Turn both the A.M. and F.M. switches to the "OFF" position. Connect a VTVM to T.P. 1 and adjust L2 for a maximum negative voltage. Connect the VTVM to T.P. 2 and adjust L3 for a maximum negative voltage.





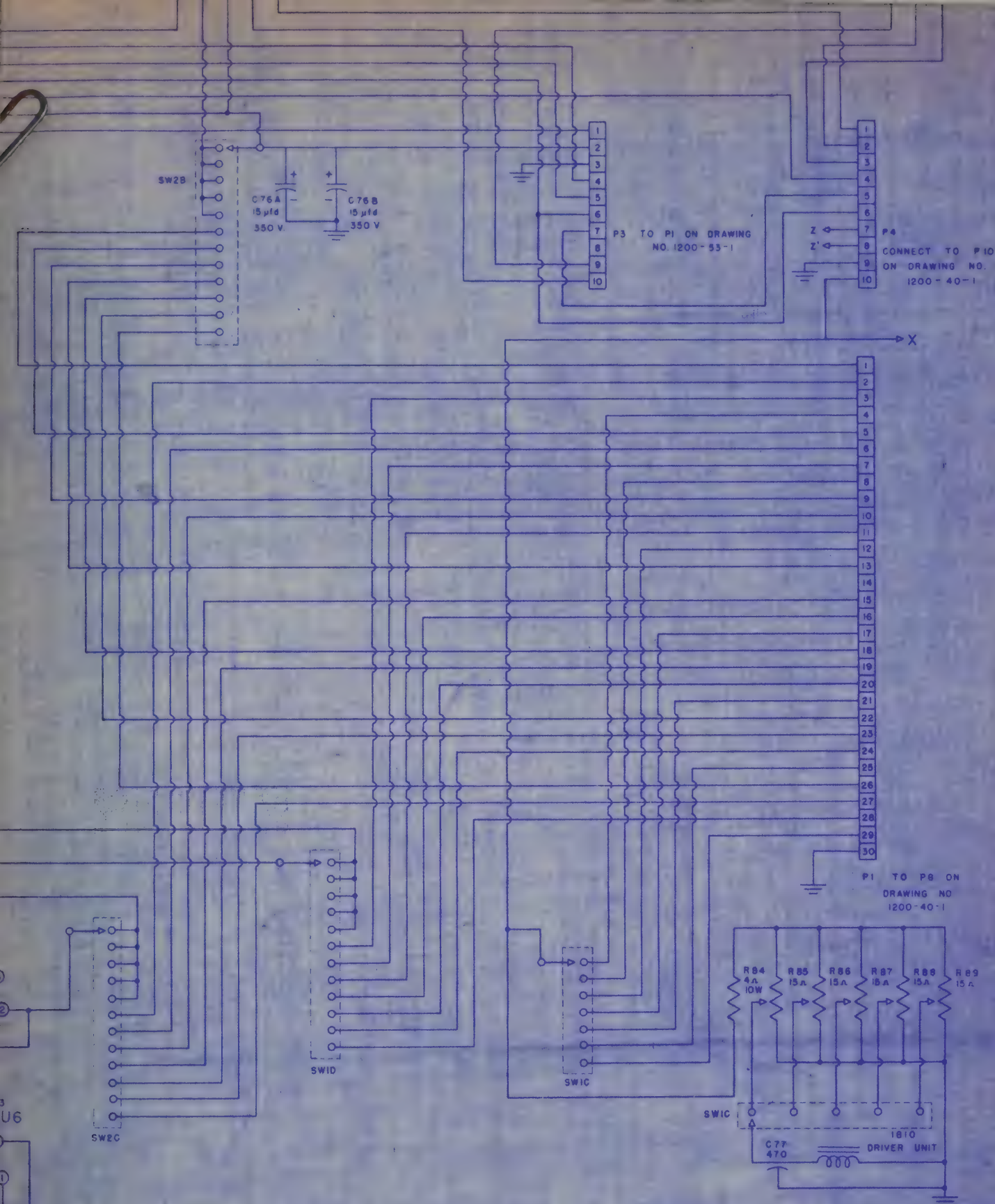
Now connect a scope with good 4.5 MC response across the properly terminated output and adjust L4, L5 and L6 for maximum output. While observing the scope, touch up the tuning of L3, L4, L5 and L6 to obtain the least incidental A.M.

Turn the A.M. switch to the "ON" position and adjust R37 for 30% modulation. Turn the A.M. switch to the "OFF" position, and the F.M. switch "ON", with S6 set to the maximum deviation position. With a deviation meter or a calibrated detector adjust R55 for 10KC deviation.









# SCHEMATIC CONTROL CHASSIS

DWG NO. 1200-52-1

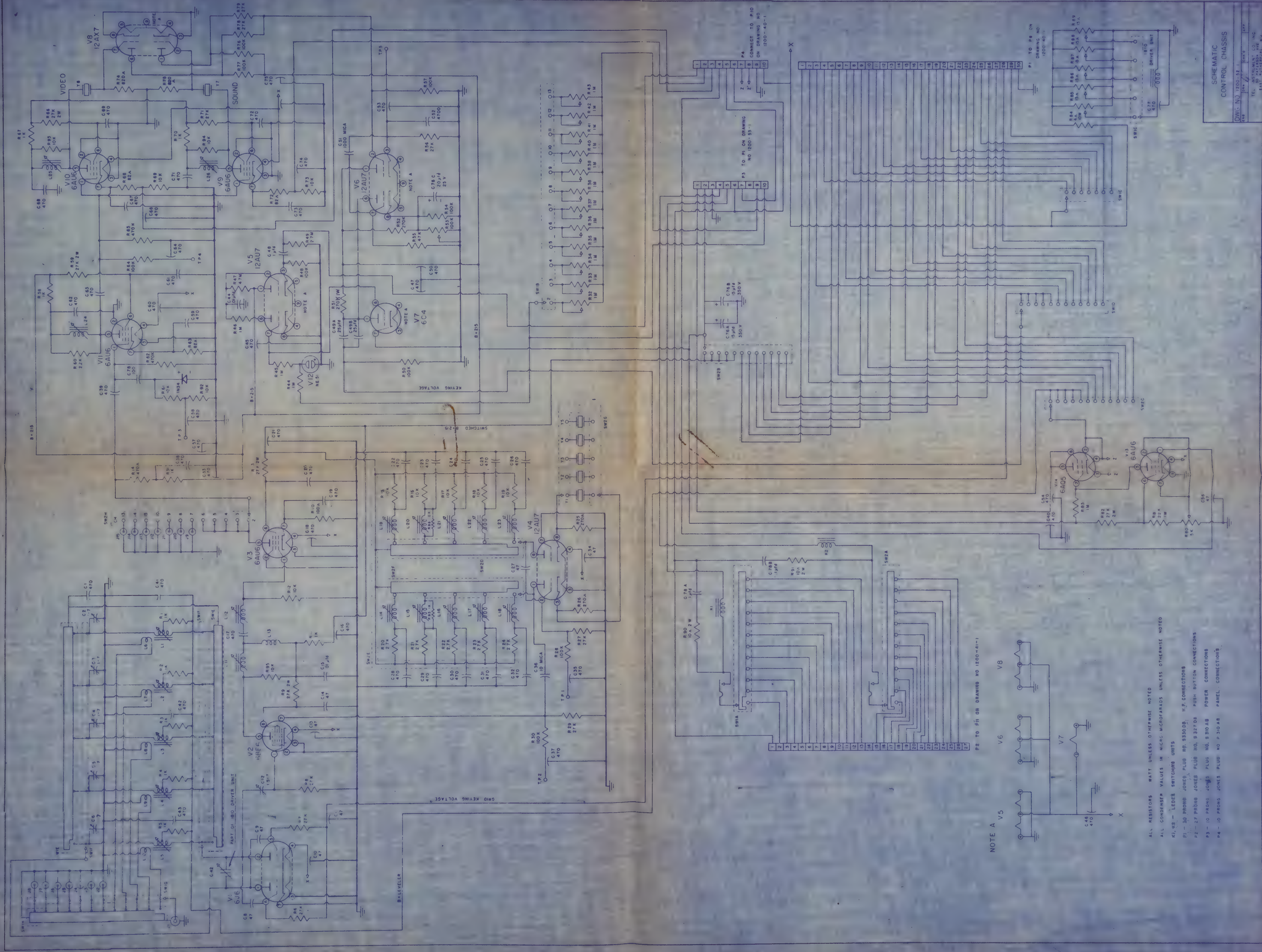
|     |     |       |     |
|-----|-----|-------|-----|
| ENG | DRN | CHK'D | APP |
|-----|-----|-------|-----|

TEL. INSTRUMENT CO. INC.  
60 PATERSON AVE.  
EAST RUTHERFORD, N.J.



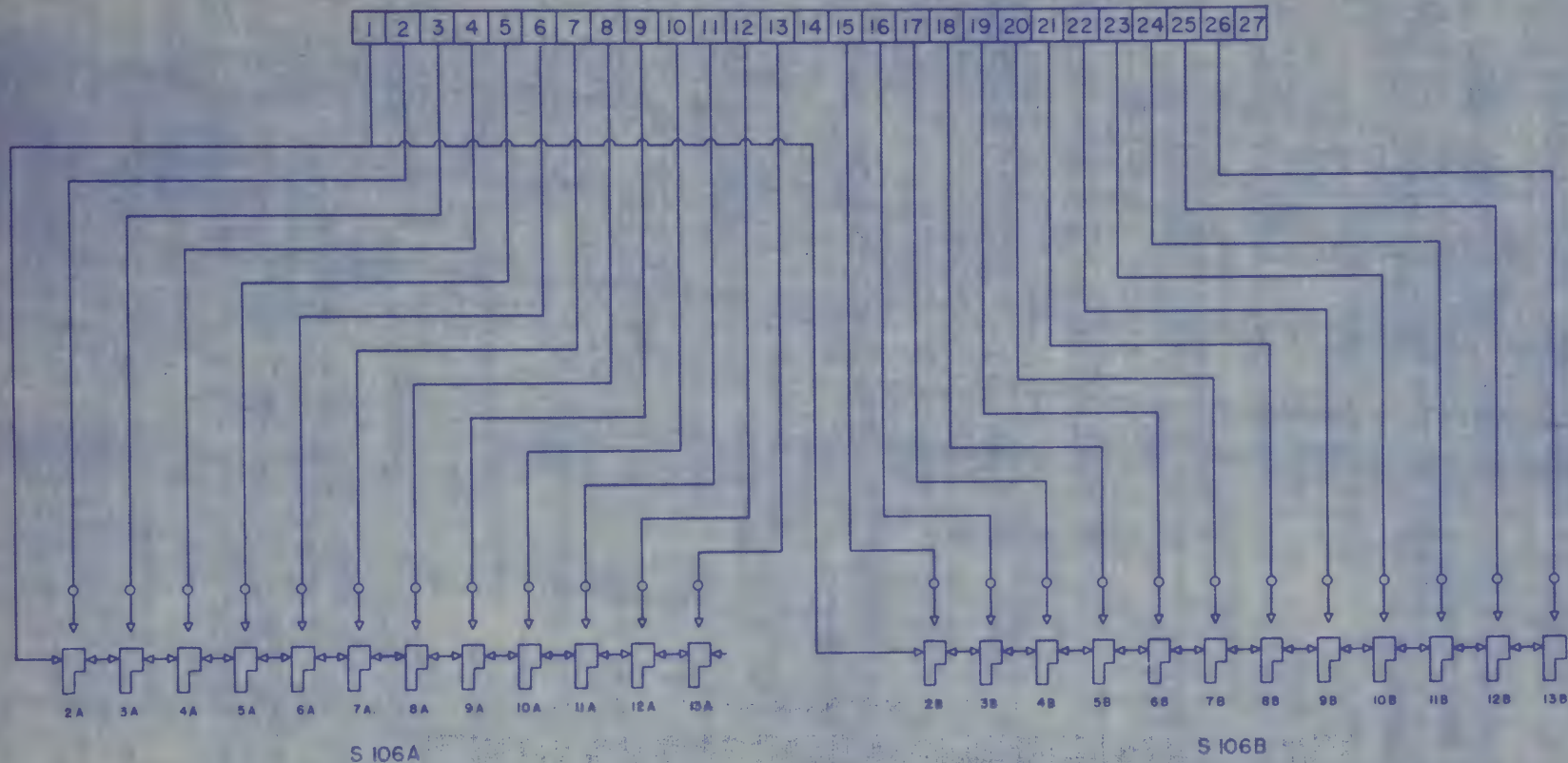








P II-27 P2 ON DRAWING NO. 1200-52-1



P II-27 PRONG JONES PLUG NO. P327FHT

S 106—REFER TO SPECIFICATION NO. S 106

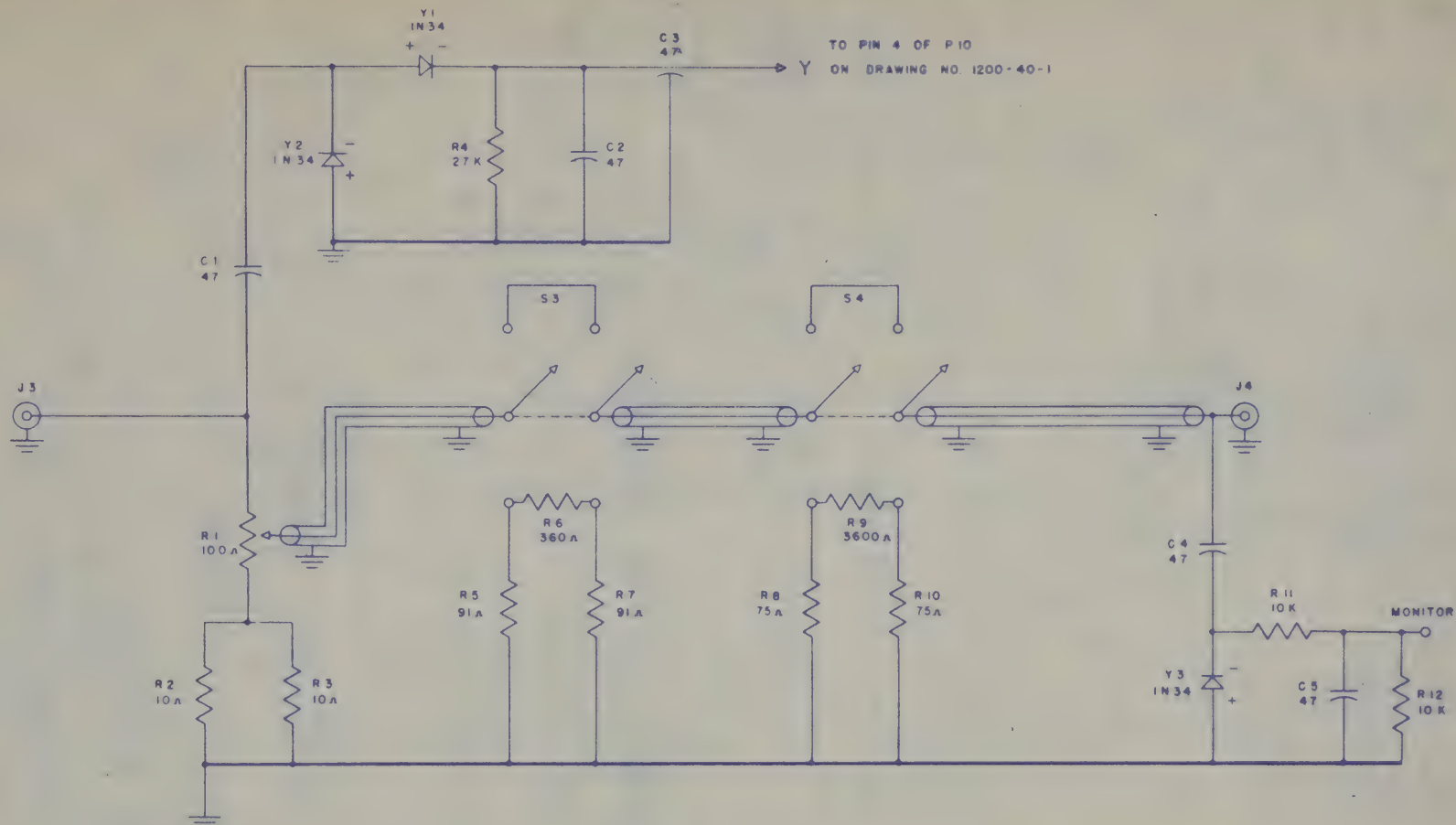
PUSH BUTTON  
WIRING DIAGRAM

DWG NO. 1200-41-1

ENG. DRN. H. E. CHS'D APP.

TEL-INSTRUMENT CO. INC.  
80 PATENSON AVE.  
EAST RUTHERFORD, N.J.





ALL RESISTORS  $\frac{1}{2}$  WATT

ALL CONDENSER VALUES IN MICRO-MICROFARADS

S3 DPDT ATTENUATOR SWITCH 10:1

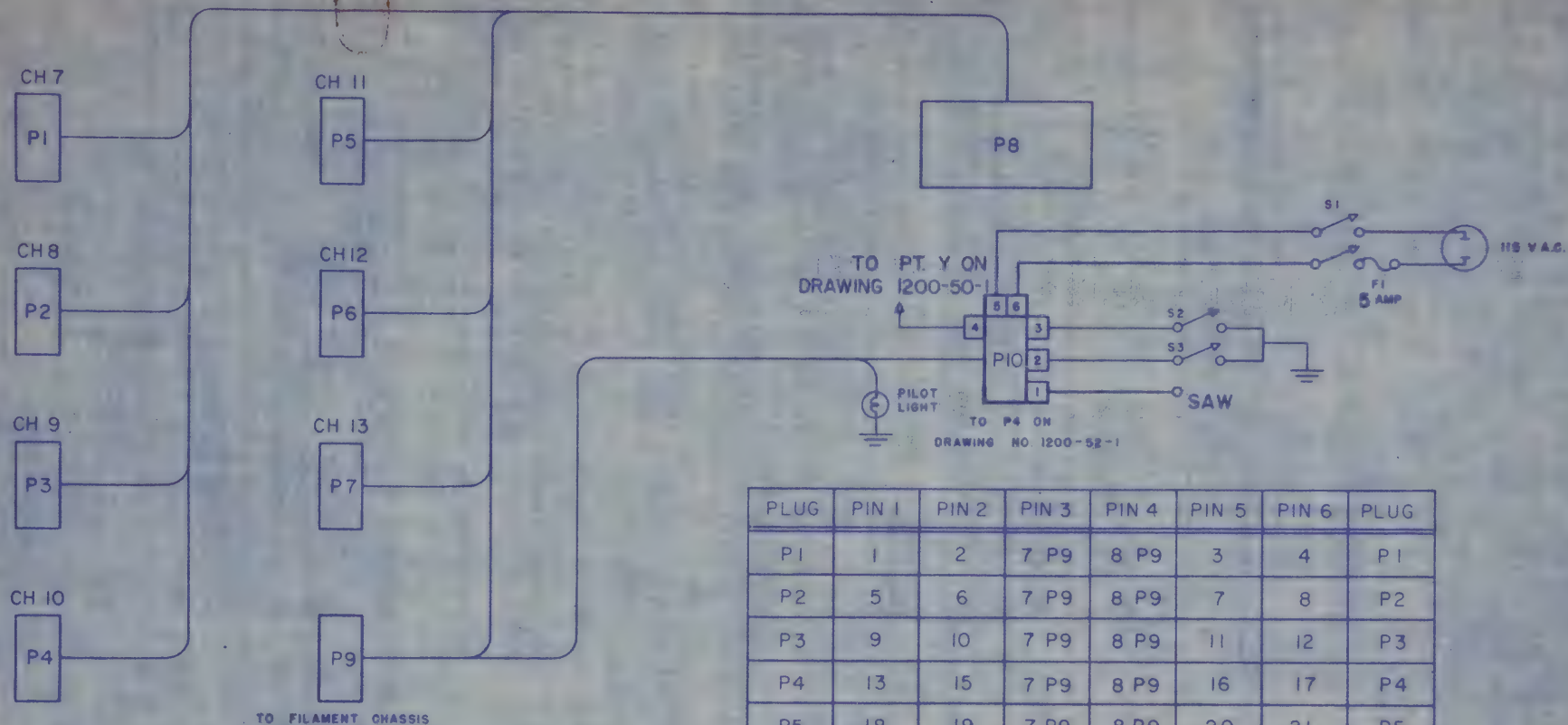
S4 DPDT ATTENUATOR SWITCH 100:1

# SCHEMATIC ATTENUATOR

DWG. NO. 1200-50-1

ENG. DRN. CHK'D. APP.

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50 PATTERSON AVE.  
EAST RUTHERFORD, N.J.



TO FILAMENT CHASSIS

ALL LEADS TERMINATE IN P8 EXCEPT THOSE FROM PINS 3 & 4 WHICH ARE CONNECTED TO PINS 7 & 8 RESPECTIVELY OF P9 ON THE FILAMENT CHASSIS, AND THE LEADS FROM P9.

P1-P7 6 PRONG JONES PLUG NO. S306FHT  
P8 30 PRONG JONES PLUG NO. P330FHT

S1 - D.P.S.T. POWER SWITCH  
S2 - S.P.S.T. VIDEO CARRIER  
S3 - S.P.S.T. SOUND CARRIER

| PLUG | PIN 1 | PIN 2 | PIN 3 | PIN 4 | PIN 5 | PIN 6  | PLUG |
|------|-------|-------|-------|-------|-------|--------|------|
| P1   | 1     | 2     | 7 P9  | 8 P9  | 3     | 4      | P1   |
| P2   | 5     | 6     | 7 P9  | 8 P9  | 7     | 8      | P2   |
| P3   | 9     | 10    | 7 P9  | 8 P9  | 11    | 12     | P3   |
| P4   | 13    | 15    | 7 P9  | 8 P9  | 16    | 17     | P4   |
| P5   | 18    | 19    | 7 P9  | 8 P9  | 20    | 21     | P5   |
| P6   | 22    | 23    | 7 P9  | 8 P9  | 24    | 25     | P6   |
| P7   | 26    | 27    | 7 P9  | 8 P9  | 28    | 29     | P7   |
| P9   | 5 P10 | 6 P10 | 7 P10 | 8 P10 | 9 P10 | 10 P10 | P9   |

ISS. 2  
14-50

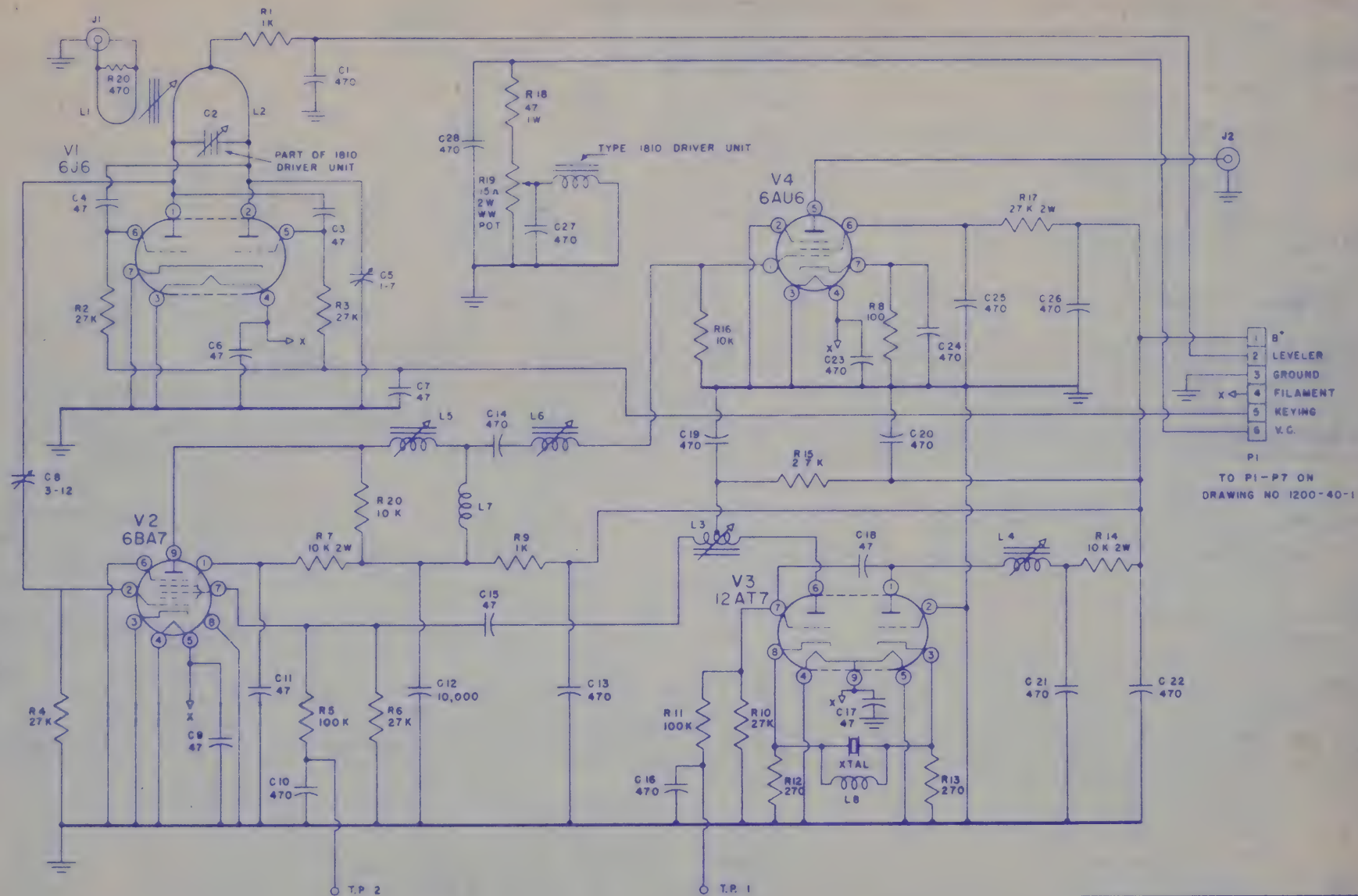
CABLE DIAGRAM

DWG. NO. 1200-40-1

ENG. DRN. HJT CHK'D APP.

TEL-INSTRUMENT CO. INC.  
90 PATERSON AVE.  
EAST RUTHERFORD, N. J.





R.F. UNIT  
CHANNELS 7-13

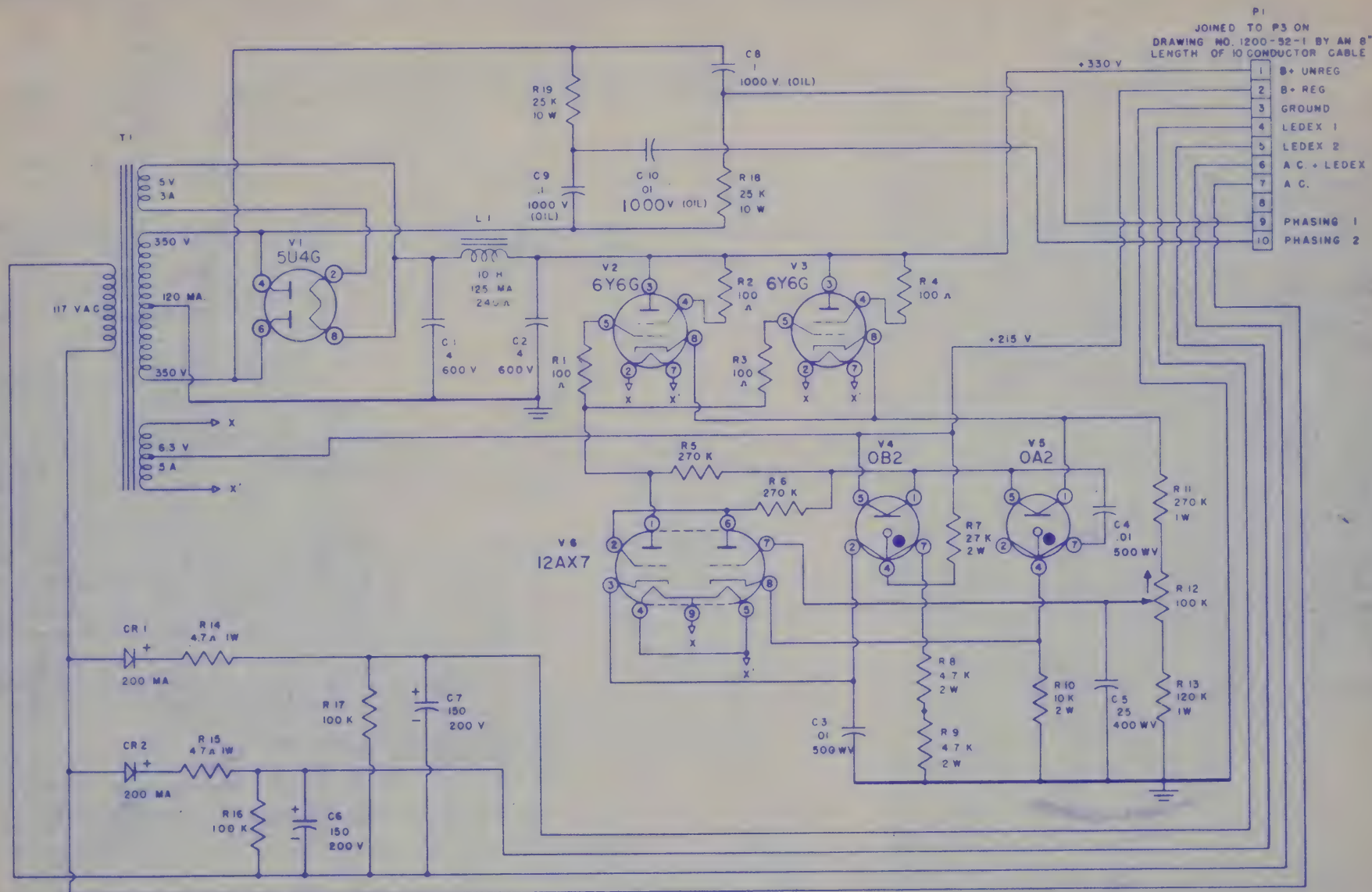
DWG NO 1200-51-1

|      |          |          |       |
|------|----------|----------|-------|
| ENGR | DRAWN BY | CHK'D BY | APP'D |
|      |          |          |       |

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EAST RUTHERFORD, N.J.







NOTE

ALL RESISTORS  $\frac{1}{2}$  WATT UNLESS OTHERWISE NOTED

ALL CONDENSER VALUES IN MICROFARADS

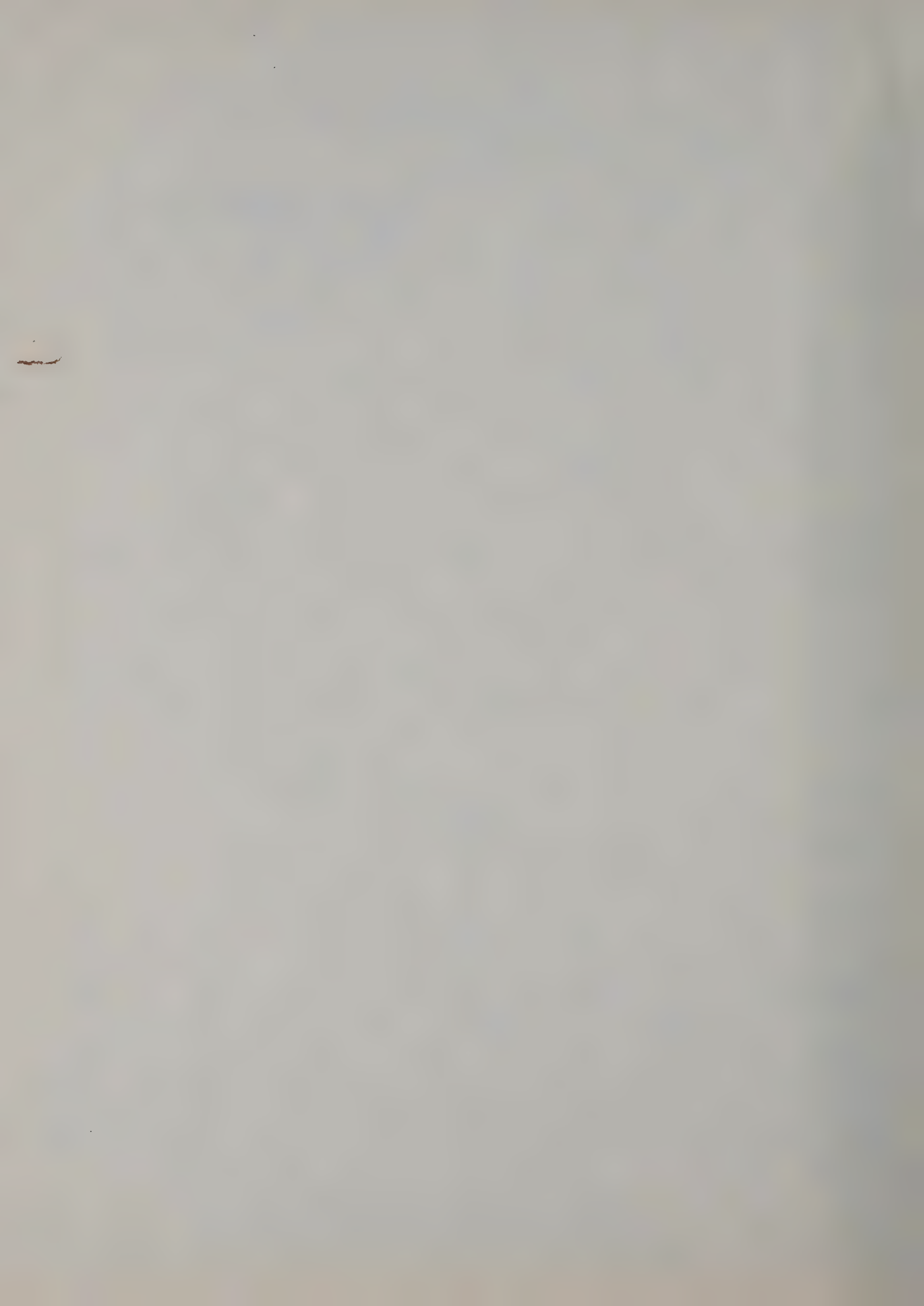
ISS 2 1-4-50

SCHEMATIC  
POWER SUPPLY

DWG. NO. 1200-33-1

|     |     |       |     |
|-----|-----|-------|-----|
| ENG | DRN | CHK'D | APP |
|-----|-----|-------|-----|

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50 PATERNON AVE.  
EAST RUTHERFORD, N.J.





ISSUE I

8-12-55

TYPE 1902A  
AM-FM SIGNAL  
GENERATOR

DWG. NO. 1902-50-1-B

ENG CLF

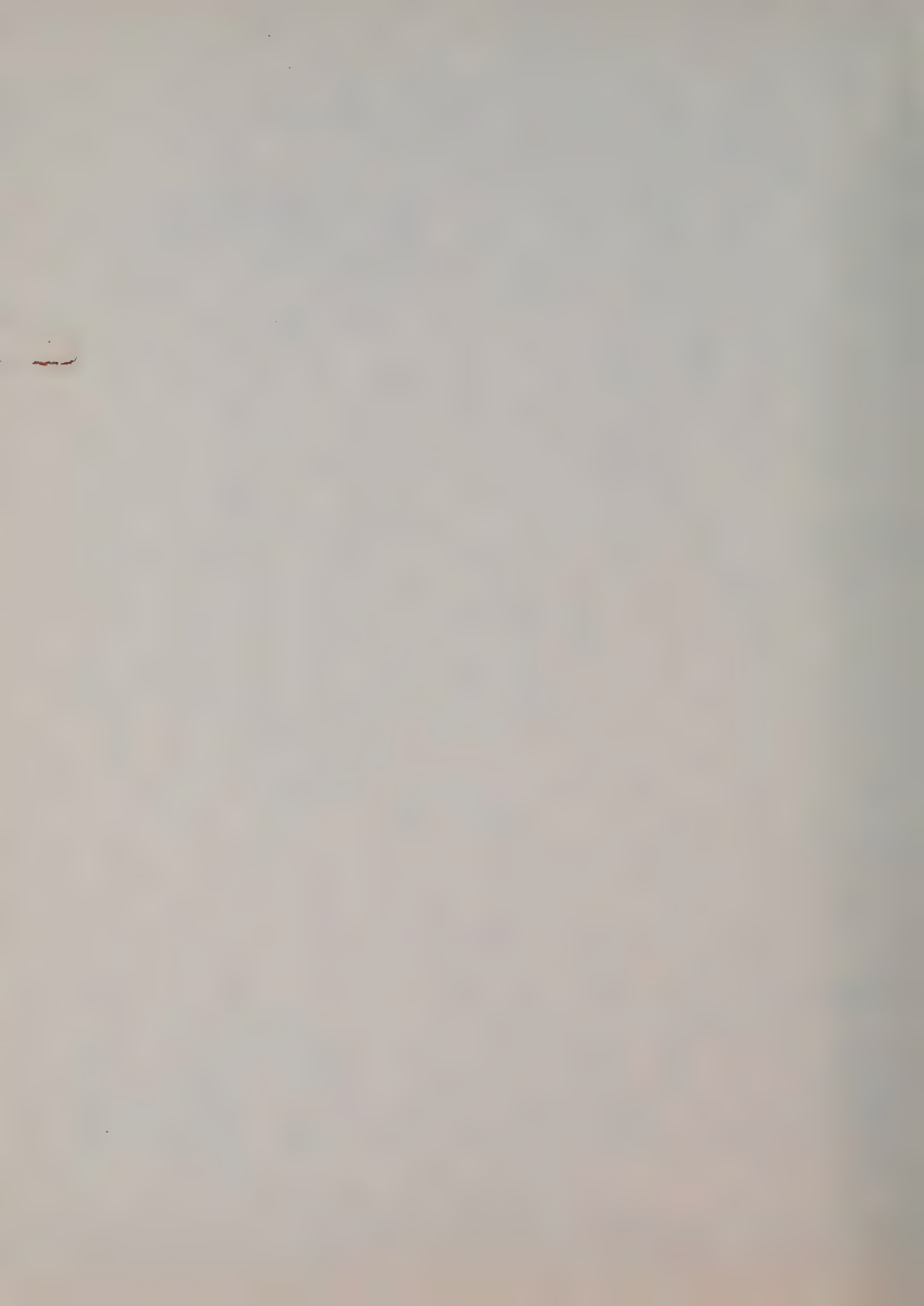
DRN

GNK

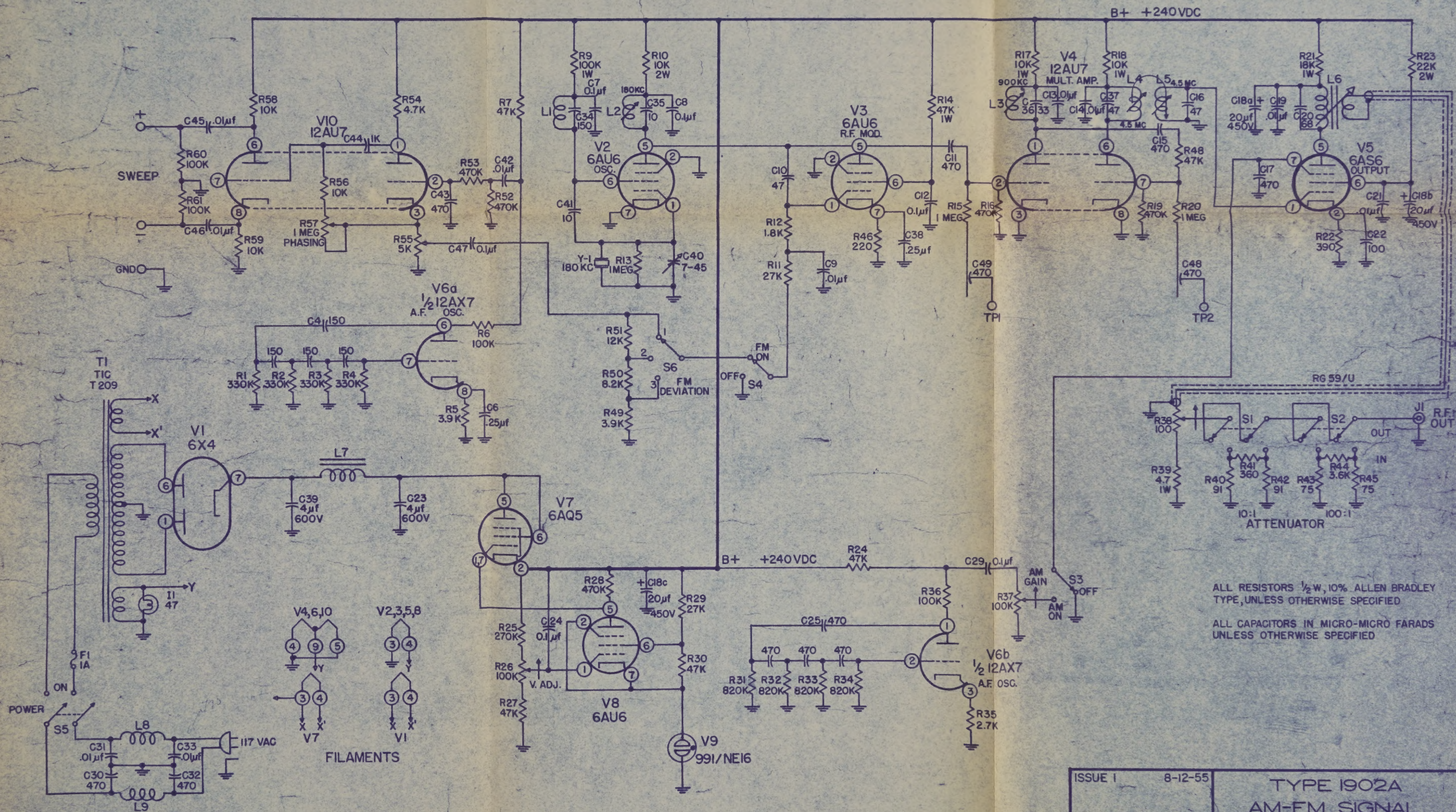
CHK'D

APP

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728 GARDEN ST., CARLSTADT, N.J.







ALL RESISTORS 1/2 W, 10% ALLEN BRADLEY TYPE, UNLESS OTHERWISE SPECIFIED

ALL CAPACITORS IN MICRO-MICRO FARADS UNLESS OTHERWISE SPECIFIED

ISSUE 1 8-12-55

# TYPE 1902A AM-FM SIGNAL GENERATOR

DWG. NO. 1902-50-1-B

ENG CLF DRN GJK CHKD APP

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728 GARDEN ST., CARLSTADT, N. J.











